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ABSTRACT

The use of machines in reading instruction was examined in 174 New Jersey school districts. From data gathered by questionnaire, the numbers, types, and usages of machines in various school districts were examined. The ratio of pupil to machine was correlated with the size of the school district, expenditures per student, and organization of the school systems (K through 8, K through 12, and 7 through 12). It was found that K through 8 school districts had the most favorable pupil/machine ratios. The size of the school district significantly influenced the number of machines owned. There was no correlation between a district's size and the pupil/machine ratio nor between a district's expenditure per pupil and its pupil/machine ratio. The instruments most frequently found in reading programs were listening and recording devices, followed by directional attack control devices and group tachistoscopes. The majority of districts used machines in both developmental and remedial reading programs. Indications for further research are made. Tables, the questionnaire, and references are included. (AL)

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A SURVEY OF READING INSTRUMENT USAGE IN NEW JERSEY PUBLIC SCHOOL READING PROGRAMS, GRADES K-12

A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

MARCIA ALPERN GREENWALD

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

NEW BRUNSWICK, NEW JERSEY JANUARY, 1972

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ABSTRACT

Reading instruction in many public-school districts is supplemented by the use of various mechanical implements. It is the purpose of this study to clarify the role of machinery in New Jersey public-school reading programs by attempting to answer the following questions:

1. Does the pupil/machine ratio differ in school districts of different organizational plans (K-8, K-12, 7-12)?

2. Is there a relationship between pupil/machine ratio and a district's yearly expenditure per pupil?

3. Is there a relationship between a district's pupil/machine ratio and its size?

4. What instruments are being used in public-school K-12 reading programs?

5. For what reading skills are these instruments being used?

6. Does machine usage differ for developmental or remedial instruction?

In order to answer these questions, a questionnaire was developed and sent to the 569 active school districts in the State of New Jersey. Replies were received from 174 (30%) of these districts. Additional information

concerning the responding districts was found in Financial Statistics of School Districts 1968-1969, a publication of the New Jersey Commissioner of Education.

To determine the similarity between the 174 responding districts and the remaining non-responding districts, seven non-responding districts were randomly selected and were sent questionnaires. Because of the similarity in the pupil/machine ratio of these seven districts and those that responded, it appears that the respondents are fairly representative of the entire population of 569.

Analysis of the data resulted in the following findings:

1. K-8 public-school districts had the most favorable pupil/machine ratios.

2. There was a significant positive correlation between the size of a district and the number of machines owned.

3. There was no correlation between a district's size and its pupil/machine ratio. There was also no correlation between a district's expenditure per pupil and its pupil/machine ratio.

4. The instruments most commonly used in public-school reading programs were listening and recording devices. These were followed by directional attack control devices and group tachistoscopes.

5. The majority of all districts using the various instruments (except for the individual tachistoscope) use them for both remedial and developmental reading.

CHAPTER I

INTRODUCTION

Simple observation of various reading programs at all levels of instruction will confirm the fact that many types of reading instruments are currently in use. Owing to a changing technology, however, very little is known about exactly what instruments are used. New and creative ways of employing existing equipment leave us uncertain as to the purposes for which these instruments are being used. If an accurate picture of instrument usage is to be drawn, it is necessary that we learn what equipment is being used and in what way.

Problem

This study will attempt to answer the following questions.

1. Does the pupil/machine ratio differ in school districts of different organizational plans (K-8, K-12, 7-12)?

2. Is there a relationship between pupil/machine ratio and a district's yearly expenditure per pupil?

3. Is there a relationship between a district's pupil/machine ratio and its size?

4. Which instruments are most widely used in New Jersey public school reading programs?

5. For what reading skills are these instruments being used?

6. Does machine usage differ for developmental or remedial instruction?

Background

Stanford Taylor, in a study done in 1960, found that 59% of all responding IRA members made some use of machines in their reading programs. The responses to this study showed great confusion as to names and functions of various instrument techniques (Taylor, 1962).

In conjunction with a presentation at the 1971 national convention, the International Reading Association is concerned with obtaining a more current assessment of instrument usage in American schools.

Procedure

In order to obtain statistical information on instrument usage in public-school reading programs, grades K-12, the public-school systems in New Jersey have been selected for study. Each district superintendent was sent a questionnaire developed to answer the previous questions. The reading instruments included on the questionnaire were limited to the following equipment:

1. Tachistoscopic instruments
2. Directional attack control devices
3. Accelerating devices
4. Listening devices
5. Recording devices
6. Motion picture projectors
7. Computer-assisted instruction equipment
8. Instructional television
9. Stopwatches

Additional information on each participating district was obtained from the 18th Annual Report of the Commissioner of Education, Financial Statistics of School Districts 1968-1969 (State of New Jersey, 1970).

Definition of Terms

For the purposes of this study, a reading instrument is defined as a mechanical implement used in reading instruction.

Tachistoscopic instruments, as defined by Taylor (1962), are individual or group projection devices which present numbers, letters, words, etc., for brief time exposures--usually ranging from 1/100 to 1-1/2 seconds. They are used to "initiate efficient perceptual skills" and to "increase recognition ability" of reading and other materials (Taylor, 1962).

Directional attack control devices are those which

present continuous reading materials in a timed, left-to-right fashion. Taylor includes in this category 16 mm motion picture films, 35 mm filmstrips, and specially designed projectors. He states that these are primarily used for "decreasing the time needed for perceptual processing" and for "improving the accuracy with which content is assimilated and understood [Taylor, 1962]."

Taylor describes accelerating devices as instruments designed to give individual practice to competent readers. These machines provide a timing mechanism (visual or auditory) which "urges the reader to maintain a higher attention level, dissuades him from rereading and encourages him to read at increasingly faster rates [Taylor, 1962]."

Computer-assisted instruction is described by Atkinson and Hansen (1966) as being a program of instruction, organized and programmed in a way that puts actual teaching under the control of the computer. This system includes complete individualization of instruction and allows for each child to proceed at his own pace.

Limitations

As a questionnaire survey, this study was obviously subject to the common limitations of questionnaire surveys. The validity of the results depend, to a large degree, on the accuracy of the responses and on the

ability to generalize the accumulated responses over the entire population. Lack of specific knowledge or a desire to appear in a favorable light could have caused some of the respondents to complete the questionnaire inaccurately. Failure to answer some of the questions was also a problem. This was particularly true of the question concerned with the number of machines owned.

Secondly, since the various districts could not be coerced into completing the questionnaire, those who did complete it are, in essence, volunteers. Their interest in completing the questionnaire may be a cause for biased results.

Ideally, when received by the superintendent, the questionnaire would be referred to a person or persons familiar with the district's entire reading program. In many districts, a person with this knowledge does not exist, and copies of the questionnaire were sent by the superintendent to the individual schools. Uneven results from these schools have caused many incomplete and unusable district results.

Confined to the limited space of a questionnaire, it was impossible to list all available reading instruments. Because of their greater visibility, listed instruments may have tended to elicit greater responses than unlisted instruments.[14]

Finally, information on district size and yearly expenditure per pupil had to be obtained from Financial Statistics of School Districts 1968-69, the most recent edition of the document currently in print. While more recent data would have been preferable, they were impossible to obtain at the time this thesis was being written. The validity of the data presented here rests on the assumption that changes in size and expenditure per pupil have been relatively proportional throughout the state.

CHAPTER II

SURVEY OF THE LITERATURE

A search of the educational literature has revealed four studies of a nature similar to the reading instrument usage survey. Two of these, a 1962 publication by Finn, Perrin, and Campion, and a 1967 study by Godfrey, deal extensively with machine usage throughout the entire American education system. The surveys conducted by Miller (1959) and Taylor (1962) deal only with machinery use in reading instruction, the former at the college level and the latter at all educational levels.

National Surveys of Instrument Usage in American Public Schools

Finn, Perrin, and Campion (1962), in an extensive study of technological growth in American education between 1930 and 1960, attempted to plot quantitative aspects of audiovisual equipment in the public schools. Equipment surveyed in this study included the following major categories:

I. Motion picture projection equipment

   A. 16 mm sound projectors

II. Still picture projection equipment

A. Slide/filmstrip projectors

B. Opaque projectors

C. Overhead transparency projectors

III. Sound equipment

A. Record players

B. Tape recorders

C. Language laboratories

D. Central sound systems

IV. Broadcast reception equipment

A. Radio receivers

B. Television receivers

Table 1 shows growth figures for the number of teachers per unit of audiovisual equipment in the United States for the years 1946-1962. The authors divide the equipment into two categories: those referred to as "older" media (motion picture projectors, slide/filmstrip projectors, record players, and radio receivers), and those referred to as "new" media (television tape recorders, language laboratories, and overhead projectors). They state:

> The "old" media are those developments introduced prior to WW II which have reached or are in the process of reaching the first plateau of their growth curve. The "new" media are innovations introduced since WW II and are still in the early stages of growth [p. 67].

For 1962, the most recent year represented, it appears that the record player was the most widely used machine. It was followed by slide/filmstrip projectors

TABLE 1

NUMBER OF TEACHERS PER UNIT OF AUDIOVISUAL EQUIPMENT IN THE U.S. PUBLIC SCHOOLS, 1946-1962[a]

Year	16 mm M.P.	Slide F.S.	Opaque proj.	O.H. proj.	Radio	Record players	Tape rec.	T.V. sets	Central sound systems	Language labs
1946	47.2	29.3	66.0		28.7	24.8			259.7	
1948	27.7	29.0	58.2		24.3	23.1			172.2	
1950	21.3	25.4	56.4		17.2	20.7			130.6	
1952	15.8	19.9	57.3		11.3	17.2	535.0		107.0	
1954	12.4	15.9	58.7	267.0	10.8	11.4	138.7	593.3	97.1	
1956	10.9	13.3	54.5	213.8	11.3	9.4	64.1	135.8	85.5	
1958	11.0	10.9	47.1	127.9	12.2	6.1	35.8	52.8	68.8	1711.6
1960	10.8	9.0	39.2	84.9	13.4	4.9	21.1	31.3	56.2	247.4
1962	10.1	7.4	31.4	61.0	13.9	4.1	14.2	21.5	46.4	146.3

[a]Finn, Perrin, and Campion, 1962.

and 16 mm sound projectors.

Eleanor Godfrey, in The State of Audiovisual Technology, 1961-1966 (1967), based her study on the 35,482 school districts in operation in October, 1959. She surveyed all 2,444 districts with a student population of 3,000 or more. The 33,038 remaining districts, those with fewer than 3,000 pupils, were sampled in different proportions according to their size. A total of 7,236 districts were surveyed and usable returns were received from 2,927 districts (40%).

Equipment studied in this survey included the following:

1. Record players
2. Slide/filmstrip projectors
3. 16 mm projectors
4. Radios
5. Tape recorders
6. Television sets
7. Opaque projectors
8. Filmstrip projectors
9. Overhead projectors
10. 2 x 2 slide projectors
11. Language laboratories

Table 2 shows usage of this equipment for school districts of varying sizes. Godfrey points out that the

TABLE 2

ESTIMATED NUMBER OF UNITS OF EQUIPMENT PER SCHOOL BY DISTRICT SIZE, SPRING 1961[a]

District size	Number of units per school										
	Recd plyr	Slide F.S. proj	16mm proj	Radio	Tape rec	T.V. set	Opaq proj	F.S. (only) proj	O.H. proj	2x2 slide proj	Language lab
Mean ratio (all districts)	3.90	1.44	1.41	0.94	1.12	0.49	0.47	0.39	0.19	0.09	0.06
75,000 or more	9.29	2.51	2.64	4.05	1.52	1.74	0.64	0.24	0.16	0.09	0.06
25,000-74,999	7.23	2.15	2.16	1.87	1.53	1.46	0.63	0.25	0.22	0.05	0.07
12,000-24,999	6.22	2.03	2.08	1.33	1.57	0.68	0.61	0.38	0.31	0.09	0.05
6,000-11,999	5.63	1.85	1.78	1.03	1.46	0.70	0.64	0.44	0.25	0.07	0.05
3,000- 5,999	4.89	1.78	1.73	1.10	1.49	0.62	0.58	0.43	0.23	0.11	0.06
1,200- 2,999	4.11	1.53	1.55	0.89	1.24	0.52	0.57	0.58	0.22	0.11	0.07
600- 1,199	3.28	1.35	1.27	0.81	1.04	0.36	0.46	0.33	0.16	0.10	0.06
300- 599	2.53	1.08	1.04	0.81	0.85	0.23	0.36	0.33	0.14	0.20	0.03
150- 299	1.80	0.89	0.86	0.77	0.63	0.26	0.26	0.25	0.08	0.05	0.04
50- 149	1.29	0.60	0.69	0.52	0.35	0.18	0.17	0.27	0.04	0.02	0.01
1- 49	0.49	0.29	0.15	0.23	0.05	0.02	0.01	0.12	0.01	--	--

[a]Godfrey, 1962.

number of units of the older and more available media are directly related to the size of the school system. This includes record players, slide/filmstrip projectors, 16 mm projectors, and radios. She states that except for television, the number of available units of the other media remains fairly constant across district size.

She feels that the even distribution of overhead projectors may be due to the fact that the overhead projector was relatively new in 1961 and schools only bought a few to be used on an experimental basis. She states that the low ratios for opaque projectors, slide projectors, and filmstrip projectors may indicate that these items are kept primarily in district administration buildings and distributed to the various schools when needed.

Table 3 represents a breakdown of instrument usage in elementary and secondary schools. Record players, 16 mm projectors, and slide/filmstrip projectors were available in most elementary and secondary schools. Radios were equally available in elementary and secondary schools, but the remaining five instruments were used most frequently in secondary schools. Godfrey feels that this may be due to the fact that these instruments, especially the tape recorder and the overhead projector, are more suitable for instruction at the secondary level. It could also be related to the limited amount of storage

TABLE 3

INCIDENCE OF EQUIPMENT ITEMS IN SCHOOL BUILDINGS, 1962, FOR BOTH TYPES OF SCHOOLS[a]

(Equipment listed in order of overall availability)

Type of equipment	Percent of schools reporting item	
	Elementary (n = 308)	Secondary (n = 209)
Record player	98	100
16 mm projector	95	100
Slide-filmstrip projector	95	98
Tape recorder	76	99
Radio	74	76
Opaque projector	61	76
Television set	40	52
Overhead projector	20	56
Language laboratory	4	42

[a]Godfrey, 1962.

space in elementary schools.

Whatever the reason, she states that elementary schools generally have a smaller variety of audiovisual equipment. Excluding the language laboratories, 28% of the secondary schools had all of the remaining eight kinds of media, while only 6% of the elementary schools had all eight kinds.

Surveys of Reading Machinery Usage

As part of a study of college-level reading programs, Lyle Miller surveyed instrument usage in participating colleges and universities. Equipment included in this study was limited to machinery used mainly in reading instruction. It did not include the many more general items used in public schools (i.e., television, tape recorders, record players, etc.). The results for the 233 responding institutions can be seen in Table 4. Miller found the tachistoscope and the reading accelerator to be the most widely used instruments. Both instruments were used primarily for motivation and individual training. He also found that the controlled reader received little use at the college level.

The most complete study available on the use of instruments in reading instruction was done by Stanford E. Taylor (1962). From a group of 7,616 members of the International Reading Association, he received replies

TABLE 4

INSTRUMENT USAGE IN 233 COLLEGES[a]

Instrument	Diagnosis	Motivation	Training	Group drill
Opthalmograph	11	4	1	--
Metronoscope	1	3	1	--
Telebinocular	65	2	2	--
Tachistoscope	25	99	84	75
Reading accelerator	22	113	131	20
Films	19	74	69	47
Orthometer	4	1	1	--
Controlled reader	2	11	13	11
Rateometer	--	1	1	--
Tachitron	1	--	--	--
Flash readers	--	--	1	--
Shadowscope	1	1	--	--
Perceptoscope	--	1	2	2

[a]Miller, 1959.

from 777 people (10%). Of these, 59% (417) made use of at least one type of instrument.

The results of this study, covering all educational levels from grade one through college, can be seen in Table 5. He found the EDL Tach-X to be the most commonly used group tachistoscope, with its greatest use in the intermediate and junior high grades. None of the individual tachistoscopes were found to be in wide use. The EDL Controlled Reader appears to be the most extensively used directional attack control device, with wide use at all levels. Finally, the SRA Accelerator appears to be the most widely used reading accelerator.

Of all listed educational levels, it appears that reading machinery is most commonly used in grades 4-12.

As can be seen from the four previously discussed studies, there is no study that includes both the general machinery used in a reading context and the specific reading machinery. It is hoped that this study will fill part of this gap.

TABLE 5

FREQUENCY OF MENTION OF USAGE OF INSTRUMENT TECHNIQUES BY GRADE LEVELS[a]

	1-3	4-6	Jr.H.	H.S.	Col.	Ad.
A. Tachistoscopes						
1. Group projection instruments						
a. EDL Tach-X	40	61	66	47	31	19
b. Keystone Flashmeter	10	26	23	17	16	9
c. SVE Speedioscope	2	5	6	2	3	4
d. Unspecified	10	24	27	24	16	10
2. Individual devices						
a. Stereo-Optical Tachitron (Renshaw)	1	5	3	2	4	2
b. AVR Eye-Span Trainer	--	--	1	1	--	--
c. Tachisto-Flasher	--	--	--	1	1	--
B. Directional attack control techniques						
1. Instruments						
a. EDL Controlled Reader	76	102	107	90	48	--
b. PDL Perceptoscope	--	--	2	3	4	3
c. Unspecified	2	2	2	1	--	1
2. 16 mm films						
a. Harvard University films	--	--	3	11	15	7

(continued)

TABLE 5 (continued)

	1-3	4-6	Jr.H.	H.S.	Col.	Ad.
b. Iowa University films (college level)	--	--	--	--	15	13
c. Purdue University films	--	--	2	3	4	2
d. C-B educational films	--	--	2	2	1	1
e. Iowa University films (high school level)	--	--	4	12	--	--
f. Unspecified	--	--	--	--	1	1
C. Accelerators						
1. SRA Accelerator	3	9	18	24	10	7
2. AVR Rateometer	2	7	9	7	2	2
3. Psychotechnics Shadowscope	--	2	2	4	2	--
4. Stereo-Optical Reading Rate Controller	--	1	3	3	3	3
5. Unspecified	1	4	7	10	8	3
Total instrument usage by grade levels	147	248	287	264	184	84

[a]Taylor, 1962.

CHAPTER III

PROCEDURE

In order to discover what machinery is currently being used in the teaching of reading, how this machinery is being used, and whether its use is affected by the size of the various districts and the amount of money spent on each pupil per year, a questionnaire was sent to all public school systems in New Jersey. This chapter contains descriptions of the population, the questionnaire and its distribution, and the statistical analysis of the data.

Population

In order to obtain information regarding instrument usage in public-school reading programs, the 592 public-school districts in the state of New Jersey were selected for study. Of these, 20 districts have no pupils and 3 districts enroll pupils only for special education. This left 569 districts for study. Replies were received from 66 of the 307 K-8 districts, 79 of the 207 K-12 districts, and 29 of the 56 7-12 districts for a total response of 174 (30%). Responding districts ranged in size from 229 pupils to 36,687 pupils, and in yearly expenditure per pupil from $363.00 to $1,308.00.

The Questionnaire

In developing the Reading Instrument Usage Questionnaire, I attempted to find answers to the following questions:

Which instruments are most widely used in New Jersey public-school reading programs?

For what reading skills are these instruments being used?

Does machine usage differ for developmental and remedial instruction?

The information needed to answer the following three questions was gained in part from the questionnaire and in part from the 18th Annual Report of the Commissioner of Education, Financial Statistics of School Districts 1968-1969.

Does the pupil/machine ratio differ in districts of different organizational plans?

Is there a relationship between the pupil/machine ratio and a district's yearly expenditure/pupil?

Is there a relationship between a district's pupil/machine ratio and its size?

Questions that could be answered by both the school districts and by reference to the above-mentioned document were not included in the questionnaire. Since the information was available elsewhere, it was felt that

including it on the questionnaire would merely complicate the task of the respondents.

The questionnaire contained a list of specific, commercially-manufactured instruments based on the results of Stanford Taylor's 1962 study. This list was supplemented by a search of various audiovisual catalogs. The instruments included were broken down into the following categories:

1. Tachistoscopic instruments
2. Directional attack control devices
3. Accelerating devices
4. Listening devices
5. Recording devices
6. Motion picture projectors
7. Instructional television
8. Computer-assisted instruction
9. Stopwatches

Space was left at the end of each category for inclusion of instruments not specifically named in the questionnaire. Similar space was also left at the end of the questionnaire.

While trying to obtain the above-mentioned information, great stress was also given to developing a questionnaire that would be brief, easy to complete, and easy to tabulate. As mentioned in Good (1963), a questionnaire

must be short enough and clear enough for a respondent to answer in a short amount of time.

Also mentioned in Good (1963) was the need to help the respondents to see the importance of the study.

> The questionnaire study should be important not only to the investigator and to the particular field of knowledge, but also to the respondent, whose psychology of motivation involves his sympathy, interest, cooperation and honesty in answering questions. Better motivation for respondents is likely to prevail if they can see the investigator's side of the problem and procedure and can see the end-results in the form of a concise summary of the study and possibly in the implementation of the findings [pp. 271-272].

To stress the importance of their responses, each district received, in the same mailing as the questionnaire, a cover letter from the Reading Center at Rutgers University. This letter emphasized the fact that the results would be used as the basis for a presentation at the 1971 Annual Convention of the International Reading Association at Atlantic City, New Jersey.

Pilot Study

In order to test for clarity, completeness, and ease of completion, a small pilot study was carried out in three school districts. The appropriate person or persons in each district were contacted and appointments were made for individual interviews. During these interviews, the purposes of the study were given and the questionnaire was filled out under the observation of the experimenter. The

respondents were then asked to comment on the clarity of the questionnaire. All reported that it was clear and easy to complete.

Distribution of the Questionnaire

The Reading Instrument Usage Survey was mailed to New Jersey's 569 active districts on January 6, 1971. This date was chosen because it was followed by a long period of time without a major vacation. As of February 5, 1961, 157 replies (26%) had been received.

In an attempt to increase the number of responses, a follow-up letter was sent out during the week of February 8, 1971. Because of a lack of funds, it was impossible to send out a new questionnaire to the non-respondents. As of February 26, the number of respondents had increased to only 174 (30%).

To insure statistical accuracy of the findings, 2% of the 417 non-respondents were randomly chosen and personal appeals were made for the return of these questionnaires. These seven districts were sent new questionnaires and the importance of their responses was emphasized through both letters and phone calls. These seven districts were studied to see if their major characteristics (size, expenditure per pupil, total number of machines, and pupil/machine ratio) were similar to those of the 174 responding districts.

Treatment of the Data

Completed responses were grouped according to type of organizational plan (K-8, K-12, and 7-12) and tabulated to answer questions 4-6 in the Introduction. Information related to questions 1-3 was computed with the use of UCLA BioMed Computer Program BMD03D, which produced the necessary statistical output.

CHAPTER IV

RESULTS

As already mentioned, usable responses were received from 30% (174) of the 569 active New Jersey public-school districts. These responses included 22% of all K-8 districts, 38% of all K-12 districts, and 52% of all 7-12 districts.

Mean data for size, expenditure per pupil, total number of machines, and pupil/machine ratio are given in Table 6. The mean number of pupils for all responding districts was 3,044. The mean expenditure per pupil was $713 and the mean number of machines per district was 75. The K-12 school districts tended to be the largest and also tended to have the greatest number of machines per district. The 7-12 districts appeared to spend the most money per child.

The first question posed in this paper concerned the relationship between pupil/machine ratio and a district's organizational plan. As shown in Table 6, the average pupil/machine ratio has been calculated in three ways. Two K-12 districts had pupil/machine ratios that were so large (12,718 and 5,767) that the mean was

TABLE 6

MEAN DATA FOR STUDY CHARACTERISTICS OF 174 RESPONDING DISTRICTS BY ORGANIZATIONAL PLAN

	All responding districts	Type of district		
		K-8 (n = 66)	K-12 (n = 79)	7-12 (n = 29)
Size of district	3044	1315	5111	1609
Expenditure per pupil	$713	$626	$703	$942
Total number of machines	75	46	115	30
Pupil/machine ratio	77[a]	52	88[a]	101

[a]Means based on data eliminating two cases whose extreme positions would have greatly distorted the results (12,718 and 5,767). Means including these two cases were 211 for all responding districts and 384 for K-12 districts. Medians for these two categories were 45 and 49, respectively. Medians for K-8 and 7-12 districts were 36 and 69, respectively.

calculated both with and without them. Both figures are reported in Table 6. The mean pupil/machine ratio for all districts without these two extreme cases was 77. The median, with these two districts, was 45. It appears from the data that K-8 districts had the lowest pupil/machine ratio, followed by K-12 and 7-12 districts.

It was stated earlier in this paper that a small follow-up survey was made of 2% of the non-responding districts. A comparison of the 174 responding districts and these 7 non-responding districts can be seen in Table 7. While there was a substantial difference in size and total number of machines between the two groups, they tended to be quite similar in expenditure per pupil and pupil/machine ratio. Because of the great disparity in the number of subjects in the two groups, a more exact statistical test could not be performed. However, the appearance of the means for pupil/machine ratio, in my opinion the most meaningful figure for this study, leads me to believe that the 174 responding districts provided a sample that is fairly representative of the total population.

In answer to question 2, Table 8 shows no significant correlation between a district's expenditure per pupil and its pupil/machine ratio.

The relationship between a district's size and its use of machinery in the reading programs, as mentioned in

TABLE 7

COMPARISON OF MEAN DATA FOR STUDY CHARACTERISTICS
FOR 174 RESPONDING DISTRICTS AND 7 (2%)
NON-RESPONDING DISTRICTS

Study characteristics	174 Responding districts	7 Non-responding districts
Size of district	3044	2405
Expenditure per pupil	$713	$703
Total number of machines	75	58
Pupil/machine ratio	77	82

TABLE 8

CORRELATIONS OF STUDY CHARACTERISTICS
BY ORGANIZATIONAL PLAN

Correlation	All responding districts	Type of district		
		K-8	K-12	7-12
District size to Total number of machines	.70*	.65*	.67*	.41**
District size to Pupil/machine ratio	.00[a]	-.03	-.05[a]	-.06
Expenditure per pupil to Pupil/machine ratio	.01[a]	-.19	-.04[a]	-.15

*Significant at .01.

**Significant at .05.

[a]Data do not include extreme cases, as mentioned in Table 6.

the third question, was not quite as clear. As can be seen in Table 8, there was a significant positive correlation between district size and total number of machines. Godfrey (1962) found a similar relationship between district size and number of instruments per district for the "older" media (record players, slide/filmstrip projectors, 16 mm projectors, and radios). She found that the number of units for the "newer" machinery, however, remained fairly constant regardless of district size.

When use of machinery was calculated as a pupil/machine ratio, there appeared to be no significant correlation between this figure and district size.

The fourth question in this paper is concerned with the reading machinery used in New Jersey public schools and their order of usage. As shown in Table 9, 89% of all responding districts used listening devices and 89% used recording devices in their reading programs, making them the most frequently used types of instrument. These were followed by directional attack control devices and group tachistoscopes.

Due to the differences in instruments surveyed, it is difficult to make a detailed comparison between the findings in Table 9 and the studies mentioned in Chapter II. However, some limited remarks can be made. Among the instruments designed specifically for reading instruction,

TABLE 9

RANK ORDER AND PERCENTAGE OF USE OF VARIOUS READING INSTRUMENT CATEGORIES FOR ALL RESPONDING DISTRICTS

Rank	Type of instrument	Percentage of use
1	Listening devices	89
1	Recording devices	89
3	Directional attack control devices	81
4	Group tachistoscopes	65
5	Stopwatches	62
6	Projectors	57
7	Accelerators	52
8	Individual tachistoscopes	40
8	Instructional television	40

I found the order of usage to be directional attack control devices (81%), group tachistoscopes (65%), and accelerators (52%). Taylor (1962) found use of group tachistoscopes to exceed that of directional attack control devices. Both surveys found the individual tachistoscope to be the least-used reading instrument.

The order of use of the various reading instruments for all organizational plans can be found in Table 13 (Appendix A). It appears that there was a great similarity in order of instrument usage for K-8 and K-12 districts, while 7-12 districts differed due to the higher ranking of directional attack control devices. This apparent difference in the secondary schools differs from Godfrey's (1967) findings (Table 3). She found the same order of usage for elementary and secondary districts.

To answer question 4 further, the order of usage for all responding districts can be found in Table 10. A summary of this table follows. Table 14 (Appendix A) contains this same information for all organizational plans.

Sixty-five percent of all districts had some sort of group tachistoscope. The EDL Tach-X was found to be the most common instrument in this category, both in this study and in that of Taylor (1962) (Table 5). The Tach-X was followed by the LTS Tachistoflasher, the Keystone Flashmeter, and the Rheem Califone Perceptomatic.

TABLE 10

READING INSTRUMENT USAGE FOR ALL RESPONDING DISTRICTS

Name of instrument	Number of districts using instrument (N = 174)	Percentage of respondents using instrument
A. Tachistoscopes		
1. Group		
a. EDL Tach-X	93	53
b. Keystone Flashmeter	24	14
c. SVE Speedioscope	13	7
d. LTS Tachistoflasher	31	18
e. Psychotechnics Tachistoscope	14	8
f. Rheem Califone Perceptomatic	20	11
g. Cenco Tachistoscope	3	2
h. Tachamatic 500	1	1
Total--group tachistoscopes	113	65
2. Individual		
a. AVR Eye Trainer	8	5
b. LTS Tachistoviewer	10	6
c. EDL Flash-X	45	26
d. Craig Reader	7	4
Total--individual tachistoscopes	70	40

(continued)

TABLE 10 (continued)

Name of instrument	Number of districts using instrument (N = 174)	Percentage of respondents using instrument
B. Directional attack control devices		
1. EDL Controlled Reader	140	80
2. PDL Perceptoscope	4	2
3. Cenco	2	1
Total--directional attack control devices	142	81
C. Accelerators		
1. SRA Accelerator	74	43
2. AVR Rateometer	23	13
3. Psychtechnics Shadowscope	4	2
4. Stereo-Optical Reading Rate Controller	2	1
5. Keystone Accelerator	1	1
6. Literary Notes Pacer	2	1
Total--accelerators	91	52
D. Listening devices		
1. Record player	143	82
2. Cassette playback unit	81	47
3. Listening station	22	13

(continued)

TABLE 10 (continued)

Name of instrument	Number of districts using instrument (N = 174)	Percentage of respondents using instrument
4. Language lab	29	17
5. Talking Page	7	4
Total--listening devices	155	89
E. Recording devices		
1. Reel-to-reel tape recorder	125	72
2. Casette tape recorder	94	54
3. Card reader	85	49
4. Dictaphone	1	1
Total--recording devices	156	89
F. Projectors		
1. Motion picture projectors	80	45
2. Filmstrip projectors	54	31
3. Overhead projectors	41	24
4. Opaque projector	17	40
5. Slide projector	3	2
6. Super 8 projector	5	3
7. Filmstrip viewer	8	5

(continued)

TABLE 10 (continued)

Name of instrument	Number of districts using instrument (N = 174)	Percentage of respondents using instrument
8. Dukane projector	4	2
Total--projectors	106	57
G. Instructional television	54	31
H. Computer-assisted instruction	3	2
I. Miscellaneous		
1. Cycloteacher	5	3
2. Autotutor	2	1
3. Stopwatch	108	62
4. Typewriter	10	6
5. Phonic mirror	1	1
6. EDL Skimmer	3	2
7. System 80	2	1
8. EDL Aud-X	9	5
9. Show-n-Tell projector	1	1
10. Hoffman projector	6	3

Individual tachistoscopes were used in 40% of the 174 districts. The most common instrument of this type was the EDL Flash-X, a brand not included in Taylor's study.

Directional attack control devices could be found in 81% of the responding districts, and in this instance one instrument, the EDL Controlled Reader, commanded almost the entire market. Reading accelerators were used by 52% of all districts. The SRA Accelerator was followed by the AVR Rateometer as the most commonly used accelerator. Taylor also found the EDL Controlled Reader and the SRA Accelerator to lead in each of these two categories.

The most common instruments, listening and recording devices, could be found in 89% of the responding districts. The record player was the most common listening device, followed by the cassette playback unit. Both Godfrey (1967) and Finn, Perrin, and Campion (1962) also found the record player to be the most extensively used instrument. The cassette playback unit and the cassette recorder were not included in either of their studies because of their rather recent appearance.

Reel-to-reel tape recorders were found to be the most common recording devices, followed by cassette tape recorders and card readers.

Finally, 57% of all responding districts used some

type of projector in reading instruction; 31% used instructional television; and only three districts used computer-assisted instruction.

In relation to question 4, a comparison has also been made concerning instrument usage in the 174 responding and 7 non-responding districts (Table 11). Even with the great difference in the number of subjects, it is interesting to note that the percentages of use for listening devices, recording devices, and group and individual tachistoscopes were very similar. This similarity in usage between the two groups was not seen for directional attack control devices, accelerators, projectors, and instructional television. Because of the small number of subjects in the group of non-respondents, the addition of only one instrument made a huge difference in the percentage of use.

Question 5 asks for a breakdown of the reading skills for which the various instruments are used. This information can be found in Table 16 (Appendix A). In order to allow the districts to give all possible uses for the instruments, this item was left unstructured. However, because of this and because many of the respondents may not have been familiar with the teaching of specific reading skills, some of the skills mentioned did not seem to fit the corresponding instrument. For example, many of

TABLE 11

COMPARISON OF THE USE OF READING INSTRUMENTS FOR 174 RESPONDENTS AND 7 NON-RESPONDENTS

Name of instrument	Responding districts using instrument		Non-responding districts using instrument	
	Number	Percent	Number	Percent
Group tachistoscopes	113	65	4	57
Individual tachistoscopes	70	40	3	43
Directional attack control devices	142	81	3	43
Accelerators	91	52	2	29
Listening devices	155	89	6	86
Recording devices	156	89	6	86
Projectors	106	57	2	29
Instructional television	54	31	1	14
Computer-assisted instruction	3	2	-	-

the districts mentioned that they used the group tachistoscope for comprehension. Since this machine is designed mainly to present only words or short phrases for extremely brief exposures, its extensive use for comprehension is rather dubious. It should be noted, however, that some tachistoscopic materials do contain some basic comprehension drills.

The last question refers to the differences in the use of reading instruments for developmental and remedial reading programs. This question is answered in Table 12. For group and individual tachistoscopes, use in remedial reading only greatly exceeded use in developmental reading only, while the opposite was true for instructional television and projectors. Use in remedial or developmental programs only was about the same for directional attack control devices. For all categories except individual tachistoscopes, use for both remedial and developmental reading far exceeded use for either program alone. For a breakdown of the specific grade levels at which these instruments were used, see Table 15 (Appendix A).

Frequency of use of the various instruments is reported in Table 17 (Appendix A). As can be seen, use for the more commonly owned instruments was usually either moderate or great.

The preceding tables and those in the appendix

TABLE 12

USE OF MAJOR INSTRUMENT CATEGORIES IN DEVELOPMENTAL AND REMEDIAL READING PROGRAMS

Type of instrument	Percent of respondents using for		
	Developmental reading only	Remedial reading only	Both
Group tachistoscopes	9	25	67[a]
Individual tachistoscopes	9	46	46
Directional attack control devices	19	20	58[b]
Accelerators	29	30	37
Listening devices	16	17	62
Recording devices	11	15	71
Projectors	35	7	48
Instructional television	54	9	25
Computer-assisted instruction	100	--	--

[a]The numbers in some rows may add up to greater than 100% because all percentages were rounded off to the nearest whole number.

[b]The numbers in some rows may add up to less than 100% because some districts did not provide the necessary information.

show clearly the great diversity of use for the various instruments. They differed in number, in skills taught, and in use in remedial and developmental programs. However, even with this great diversity, it has become obvious to me that they do play a large part in the reading programs of New Jersey public schools.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

In an attempt to determine various factors in reading instrument usage in New Jersey public schools, a questionnaire was sent to the state's 569 active districts. Usable replies were received from 174 (30%) of the state's public-school districts. Two percent of the non-respondents were also surveyed so that a comparison between the responding and the non-responding districts could be made.

The K-8 districts tended to have the most favorable pupil/machine ratio, followed by K-12 and 7-12 districts. There was found to be no significant correlation between pupil/machine ratio and expenditure per pupil. A significant correlation did exist between district size and total number of machines used, as could be expected, but there was no relationship between district size and pupil/machine ratio.

In comparing the 174 responding districts with the 7 non-responding districts, great similarities were seen in expenditure per pupil and pupil/machine ratio. However, this was not true of size and total number of

machines.

It was found that the most widely used types of instrument were listening and recording devices. These were followed by directional attack control devices and group tachistoscopes.

Finally, it was found that machinery was used by the various districts to teach a wide range of reading skills in both remedial and developmental programs.

Conclusions

Organizational plans. It appears from the data that a district's pupil/machine ratio depended, in part, on its organizational plan, with K-8 districts having relatively more machines per pupil, followed by K-12 and 7-12 districts.

Size. It was found that there was a significant positive correlation between the size of a school district and its total number of reading instruments. There was, however, no correlation between the size of a district and its pupil/machine ratio.

From this information, it would seem that larger districts were buying enough extra equipment to keep them on a par with the smaller districts, but not enough extra to provide more reading machinery per child.

Expenditure per pupil. There was found to be no correlation between a district's expenditure per pupil and

its pupil/machine ratio.

This leads to the conclusion that districts with more available money to spend were not using it to provide more equipment to be used in the teaching of reading.

Order of use of various instruments. The two most popular categories seem to be recording devices and listening devices. I feel that their great use can be attributed to a number of factors. They are easy to operate and can be used by teachers or pupils in individual or group situations. They also have many educational uses outside of the reading program which would ensure their presence in almost all schools. This ready availability can, in many ways, explain their intensive use.

Directional attack control devices and group tachistoscopes were the most commonly used instruments specifically intended to teach reading. Their extensive use may be due to the fact that they fit in so well with the group teaching methods of most classroom teachers.

Besides order of use of the various categories, a few words should be said about order of use within categories. In the first three reading instrument categories, group tachistoscopes, individual tachistoscopes, and directional attack control devices, products by the Educational Development Laboratories (EDL) seem to dominate the market. There are a number of possible reasons

for this domination, and it would be interesting to find out exactly what is causing it.

Reading skills taught. It appears that the public schools use reading instruments to teach a number of diverse reading skills. Those most commonly mentioned were comprehension, phonics, word recognition, speed, visual training, listening, and oral reading. The extensive use of this equipment in the teaching of reading seems to contradict the fact that many research studies have concluded that they are not particularly effective in the teaching of reading. This leads me to believe that the schools are either unaware of the existing research or that they feel that it does not pertain to their particular situations.

Use in remedial and developmental reading. It appears that most of the districts using machinery to teach reading employed it in both developmental and remedial programs.

Need for Further Research

1. It is impossible to tell from the data which machinery is being purchased solely for the teaching of reading and which machinery is being purchased for a number of other educational purposes.

2. Although it is apparent that reading instruments are being used to teach a number of reading skills,

we do not know if the reading personnel in the various districts are satisfied with their effectiveness.

3. It is apparent that one company dominates over many others in the distribution of reading equipment. It would be interesting to discover the reasons for this domination.

4. It is suggested that any additional surveys in this area utilize the individual school rather than the district as the basic unit of research. This should generate a higher level of response due to the elimination of a non-productive element in the information flow. By taking random samples from the populations of elementary and secondary districts, the experimenter will also be able to make more accurate comparisons between these two levels of education.

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APPENDIX A

ADDITIONAL DATA FOR RESPONDING DISTRICTS

TABLE 13

RANK ORDER AND PERCENTAGE OF USE OF VARIOUS READING INSTRUMENT CATEGORIES FOR ALL ORGANIZATIONAL PLANS

Rank order	Reading instrument category	Percent of use
	All Responding Districts	
1	Listening devices	89
1	Recording devices	89
3	Directional attack control devices	81
4	Group tachistoscopes	65
5	Projectors	57
6	Accelerators	52
7	Individual tachistoscopes	40
7	Instructional television	40
	Responding K-8 Districts	
1	Recording devices	100
2	Listening devices	95
3	Directional attack control devices	85
4	Group tachistoscopes	67
5	Projectors	57
6	Accelerators	39
7	Individual tachistoscopes	36
8	Instructional television	21

(continued)

TABLE 13 (continued)

Rank order	Reading instrument category	Percent of use
	Responding K-12 Districts	
1	Listening devices	96
2	Recording devices	88
2	Directional attack control devices	88
4	Group tachistoscopes	75
5	Projectors	68
6	Accelerators	61
7	Instructional television	47
8	Individual tachistoscopes	45
	Responding 7-12 Districts	
1	Directional attack control devices	76
2	Listening devices	72
3	Recording devices	69
4	Group tachistoscopes	69
5	Accelerators	69
6	Projectors	38
7	Individual tachistoscopes	34
8	Instructional television	14

TABLE 14

READING INSTRUMENT USAGE BY ORGANIZATIONAL PLAN

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
A. Tachistoscopes								
1. Group								
a. EDL Tach-X	93	53	28	41	49	64	16	55
b. Keystone Flashmeter	24	14	9	13	10	13	5	17
c. SVE Speedioscope	13	7	6	9	7	9	--	--
d. Learning-through-Seeing Tachistoflasher	31	18	9	13	21	27	1	3
e. Psychotechnics Tachistoscope	14	8	3	4	8	10	3	10
f. Rheem Califone Perceptomatic	20	11	7	10	13	18	--	--
g. Cenco Tachistoscope	3	2	--	--	3	4	--	--

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
h. Tachamatic 500	1	1	--	--	--	--	1	3
Total--group tachistoscopes	113	65	44	67	59	75	20	69
2. Individual								
a. AVR Eye Trainer	8	5	2	3	6	8	--	--
b. Learning-through-Seeing Tachistoviewer	10	6	2	3	8	10	--	--
c. EDL Flash-X	45	26	24	35	32	42	11	38
c. Craig Reader	7	4	4	6	3	4	--	--
Total--individual tachistoscopes	70	40	24	36	36	45	11	34
B. Directional attack control devices								
1. EDL Controlled Reader	140	80	55	81	64	83	21	72

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
2. PDL Perceptoscope	4	2	1	2	3	4	--	--
3. Cenco	2	1	--	--	2	3	--	--
Total--directional attack control devices	142	81	56	85	64	88	22	76
C. Accelerators								
1. SRA Accelerator	74	43	17	25	39	51	18	62
2. AVR Rateometer	23	13	9	13	10	13	4	14
3. Psychotechnics Shadow-scope	4	2	3	4	--	--	1	3
4. Stereo-Optical Reading Rate Controller	2	1	1	2	1	1	--	--
5. Keystone Accelerator	1	1	--	--	--	--	1	3

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
6. Literary Notes Pacer	2	1	--	2	1	1	--	--
Total--accelerators	91	52	26	39	45	61	20	69
D. Listening devices								
1. Record player	143	82	58	85	65	84	20	69
2. Cassette playback unit	81	47	34	50	39	51	8	28
3. Listening station	22	13	10	15	11	14	1	3
4. Language lab	29	17	12	18	15	19	2	7
5. Talking Page	7	4	4	6	3	4	--	--
Total--listening devices	155	89	63	95	71	96	21	72

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
E. Recording devices								
1. Reel-to-reel tape recorder	125	72	48	71	61	79	16	55
2. Cassette tape recorder	94	54	39	57	48	62	7	24
3. Card readers	85	49	33	49	46	60	6	21
4. Dictaphone	1	1	--	--	1	1	--	--
Total--recording devices	156	89	66	100	70	88	20	69
F. Projectors								
1. Motion picture projectors	80	45	33	49	41	53	6	21
2. Filmstrip projectors	54	31	19	28	31	40	4	14
3. Overhead projector	41	24	14	21	23	30	4	14

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
4. Opaque projector	17	40	6	9	10	13	1	3
5. Slide projector	3	2	1	2	2	3	--	--
6. Super 8 projector	5	3	1	2	4	5	--	--
7. Filmstrip viewer	8	5	2	3	6	8	--	--
8. Dukane projector	4	2	2	3	1	1	1	3
Total--projectors	106	57	41	62	54	68	11	38
G. Instructional television	54	31	14	21	36	47	4	14
H. Computer-assisted instruction	3	2	--	--	3	4	--	--
I. Miscellaneous								
1. Cycloteacher	5	3	2	3	2	3	--	--

(continued)

TABLE 14 (continued)

Name of instrument	Responding districts using instrument							
	Total (n = 174)		K-8 (n = 66)		K-12 (n = 79)		7-12 (n = 29)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
2. Autotutor	2	1	--	--	1	1	1	3
3. Stopwatch	108	62	38	56	49	64	21	72
4. Typewriter (used to teach reading)	10	6	3	4	7	9	--	--
5. Phonic mirror	1	1	--	--	1	1	--	--
6. EDL Skimmer	3	2	--	--	3	4	--	--
7. System 80	2	1	2	3	--	--	--	--
8. EDL Aud-X	9	5	1	2	4	5	5	17
9. Show-n-Tell Projector	1	1	--	--	1	1	--	--
10. Hoffman Projector	6	3	5	8	--	--	1	3

TABLE 15

USE OF READING INSTRUMENTS IN DEVELOPMENTAL AND REMEDIAL READING PROGRAMS

	No. of districts using instmt	Percent using for			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
A. Tachistoscopes												
1. Group												
a. EDL Tach-X	93	13	18	63	29	39	46	18	13	53	36	29
b. Keystone Flash-meter	24	21	42	38	4	17	33	29	25	46	33	21
c. SVE Speedio-scope	13	8	38	38	15	46	23	8	31	38	31	8
d. LTS Tachisto-flasher	31	3	35	48	32	35	6	---	32	48	13	3
e. Psychotechnics Tachistoscope	14	21	29	50	14	21	36	36	7	7	43	21
f. Rheem Califone Perceptamatic	20	15	25	40	15	35	15	---	40	55	5	---

(continued)

TABLE 15 (continued)

	No. of districts using instmt	Percent using			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
g. Cenco Tachistoscope	3	67	33	33	---	---	67	33	---	33	67	---
h. Tachomatic 500	1	100	---	---	---	---	---	100	---	100	---	---
2. Individual												
a. AVR Eye Trainer	8	---	63	---	---	---	---	---	50	58	25	---
b. LTS Tachistoviewer	10	20	60	30	20	30	30	---	50	60	60	10
c. EDL Flash-X	45	13	40	44	31	44	49	33	64	82	80	31
d. Craig Reader	7	35	20	45	14	14	29	29	29	14	43	29
B. Directional attack control devices												
1. EDL Controlled Reader	140	18	19	59	31	43	27	13	40	31	51	29

(continued)

TABLE 15 (continued)

	No. of dis-tricts using instmt	Percent using for			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
2. PDL Perceptoscope	4	---	25	50	---	25	25	25	50	25	---	1
3. Cenco	2	---	50	5	---	---	50	50	---	50	100	---
C. Accelerators												
1. SRA Accelerator	74	31	24	26	11	15	38	47	16	36	42	30
2. AVR Rateometer	23	39	30	22	---	13	39	26	17	26	21	7
3. Psychotechnics Shadowscope	4	25	---	50	---	25	25	25	50	25	---	25
4. Stereo-Optical Reading Rate Controller	2	---	50	50	---	---	50	50	---	50	100	---
5. Keystone Accel-erator	1	---	---	---	---	---	---	---	---	---	---	---
6. Literary Notes Pacer	2	---	---	100	50	50	50	---	50	50	50	50

(continued)

TABLE 15 (continued)

	No. of districts using instmt	Percent using for			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
D. Listening devices												
1. Record player	143	21	15	63	73	69	55	26	57	63	48	11
2. Casette playback unit	81	20	21	52	64	54	41	10	57	49	32	5
3. Listening station	22	18	---	45	73	55	23	5	55	45	27	14
4. Language lab	29	38	24	34	45	55	21	17	41	45	45	7
5. Talking Page	7	43	43	14	57	29	29	14	71	43	14	---
E. Recording devices												
1. Reel-to-reel tape recorder	125	19	12	62	45	57	47	29	51	55	45	14
2. Cassette tape recorder	94	21	17	59	59	30	38	15	53	57	39	11

(continued)

TABLE 15 (continued)

	No. of districts using instmt	Percent using for			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
3. Card Reader	85	13	34	42	54	44	24	12	46	52	19	14
4. Dictaphone	1	---	---	---	---	---	---	---	---	---	---	---
F. Projectors												
1. Motion picture projectors	80	54	6	34	76	71	55	14	28	26	19	13
2. Filmstrip projectors	54	28	20	43	63	56	15	7	50	30	28	11
3. Overhead projectors	41	41	15	41	76	68	27	5	49	54	24	15
4. Opaque projectors	17	41	6	35	29	35	18	6	24	24	12	6
5. Slide projectors	3	67	---	33	100	100	33	---	33	33	33	---
6. Super 8 projectors	5	20	20	20	20	60	---	---	60	40	---	---

(continued)

TABLE 15 (continued)

	No. of districts using instmt	Percent using for: Devl rdg only	Rmdl rdg only	Both	Developmental %: Grades K-3	4-6	7-9	10-12	Remedial %: Grades K-3	4-6	7-9	10-12
7. Filmstrip viewer	8	---	25	50	38	38	13	13	38	38	38	---
8. Dukane projector	4	---	25	50	75	75	---	---	25	75	75	---
G. Instructional television	54	52	9	30	74	69	19	7	24	20	17	4
H. Computer-assisted instructor	3	100	---	---	67	67	---	---	---	---	---	---
I. Miscellaneous												
1. Cycloteacher	5	---	80	---	---	---	---	20	40	60	20	---
2. Autotutor	2	---	---	50	---	50	50	---	---	50	50	---
3. Stopwatch	108	12	28	44	24	31	19	16	39	52	43	25
4. Typewriter	10	20	30	2	30	20	---	---	30	30	---	---

(continued)

TABLE 15 (continued)

	No. of districts using instmt	Percent using for			Developmental %				Remedial %			
					Grades				Grades			
		Devl rdg only	Rmdl rdg only	Both	K-3	4-6	7-9	10-12	K-3	4-6	7-9	10-12
5. Phonic mirror	1	---	100	---	---	---	---	---	100	100	---	---
6. EDL Skimmer	3	67	---	---	---	---	67	100	---	---	---	---
7. System 80	2	---	---	50	50	---	---	---	50	---	---	---
8. EDL Aud-X	9	---	56	33	22	11	22	11	---	56	56	44
9. Show-n-Tell Projector	1	100	---	---	100	---	---	---	---	---	---	---
10. Hoffman projector	6	17	33	---	---	17	17	17	17	67	33	---

Note: The percentages across the rows may add up to greater than 100% because many districts use the instruments at a number of grade levels, and the percentages across the rows may add up to less than 100% because some districts did not provide the necessary information.

TABLE 16

READING SKILLS TAUGHT BY VARIOUS INSTRUMENTS

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
A. Tachistoscope														
1. Group														
a. EDL Tach-X	93	41	28	17	60	29	---	---	9	---	---	1	---	---
b. Keystone Flash-meter	24	29	17	21	91	46	---	---	4	---	---	---	---	---
c. SVE Speedioscope	13	38	8	15	54	31	---	---	15	---	---	---	---	---
d. Learning-through-Seeing Tachisto-flasher	31	35	45	29	48	13	---	---	6	---	---	---	---	---
e. Psychotechnics	14	36	36	29	50	43	---	---	7	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
f. Rheem Califone Perceptamatic	20	---	20	15	35	30	---	---	10	---	---	---	---	---
g. Cenco Tachisto-scope	3	---	---	33	---	67	---	---	33	---	---	---	---	---
h. Tachomatic 500	1	---	---	---	---	---	---	---	---	---	---	---	---	---
2. Individual														
a. AVR Eye Trainer	8	38	25	13	50	38	---	---	---	---	---	---	---	---
b. Learning-through-Seeing Tachisto-viewer	10	50	70	1	5	1	---	---	---	---	---	---	---	---
c. EDL Flash-X	45	22	51	53	76	31	---	---	24	---	---	2	---	---
d. Craig Reader	7	14	---	---	14	57	14	---	14	---	14	---	14	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
B. Directional attack control devices														
1. EDL Controlled Reader	140	85	16	7	71	15	---	---	7	---	---	2	---	---
2. PDL Perceptoscope	4	75	25	25	25	100	---	---	75	---	1	---	---	---
3. Cenco	2	50	---	---	50	---	---	---	---	---	---	---	---	---
C. Accelerators														
1. SRA Accelerator	74	54	8	5	66	8	---	---	---	---	---	3	---	---
2. AVR Rateometer	23	39	4	4	87	---	---	---	---	---	---	---	---	---
3. Psychotechnics Shadowscope	4	25	50	---	75	---	---	---	---	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
4. Stereo-Optical Reading Rate Controller	2	50	---	---	100	50	---	---	---	---	---	---	---	---
5. Keystone Accelerator	1	---	100	---	100	100	---	---	---	---	---	---	---	---
6. Literary Notes Pacer	2	50	---	---	100	---	---	---	---	---	---	---	---	---
D. Listening devices														
1. Record player	143	52	52	5	7	---	4	36	1	3	1	6	---	---
2. Cassette playback unit	81	49	49	2	6	---	1	15	4	2	4	2	---	---
3. Listening station	22	36	45	5	---	---	---	23	---	---	---	---	---	---
4. Language lab	29	34	45	7	7	3	7	---	---	---	7	---	---	---
5. Talking Page	7	43	43	14	14	29	43	---	---	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
E. Recording devices														
1. Reel-to-reel tape recorder	125	50	30	2	8	---	7	29	4	2	2	2	18	---
2. Cassette tape recorder	94	55	40	---	4	---	14	16	5	1	2	3	16	---
3. Card readers	85	33	52	40	4	1	4	1	6	1	6	1	---	---
4. Dictaphone	1	---	---	---	---	---	---	---	---	---	---	---	---	---
F. Projectors														
1. Motion picture projectors	80	39	3	---	13	1	1	1	3	5	4	5	---	---
2. Filmstrip projectors	54	70	52	9	4	---	---	---	6	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
3. Overhead projectors	41	49	59	5	---	10	2	5	15	5	2	---	---	---
4. Opaque projectors	17	18	12	---	---	---	---	---	12	6	---	---	---	---
5. Slide projectors	3	33	33	33	33	33	---	33	---	---	---	---	---	---
6. Super 8 projector	5	---	---	---	---	---	---	---	---	---	20	---	---	---
7. Filmstrip projector	8	---	---	---	---	50	25	---	13	---	---	---	---	---
8. Dukane projector	4	75	25	---	---	---	---	---	---	---	---	25	---	---
G. Instructional television	54	39	11	---	---	---	2	6	---	20	2	4	---	---
H. Computer-assisted instruction	3	---	---	---	---	---	---	---	---	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
I. Miscellaneous														
1. Cycloteacher	5	---	---	---	---	20	---	---	20	---	---	---	---	---
2. Autotutor	2	---	---	---	---	---	---	---	---	---	---	---	---	---
3. Stopwatch	108	15	1	---	38	---	---	---	---	---	---	2	---	50
4. Typewriter	10	10	---	10	---	20	10	10	---	---	---	10	---	---
5. Phonic mirror	1	---	100	100	---	---	---	---	---	---	---	---	---	---
6. EDL Skimmer	3	---	---	---	---	100	---	---	---	---	---	---	---	---
7. System 80	2	100	100	50	---	---	---	---	---	---	---	---	---	---
8. EDL Aud-X	9	56	---	11	---	---	---	---	11	---	---	---	---	---

(continued)

TABLE 16 (continued)

Name of instrument	Number of districts using instrument	Comprehension	Phonics	Word recognition	Speed	Visual training	Auditory training	Listening	Vocabulary	Experience background	Language development	Motivation	Oral reading	Testing
9. Show-n-Tell Projector	1	---	---	---	---	100	---	---	---	100	---	---	---	---
10. Hoffman projector	6	17	---	---	---	---	---	---	---	---	---	---	---	---

Note: The percentages across the rows may add up to greater than 100% because many districts use the same instrument to teach a number of skills.

TABLE 17

FREQUENCY OF USE OF READING INSTRUMENTS

Name of instrument	Number used	Percent		
		Little[a]	Moderate[b]	Great[c]
A. Tachistoscopes				
1. Group				
a. EDL Tach-X	93	10	30	62
b. Keystone Flash-meter	24	8	46	42
c. SVE Speedioscope	13	8	38	54
d. Learning-through-Seeing Tachisto-flasher	31	13	39	45
e. Psychotechnics Tachistoscope	14	--	50	29
f. Rheem Califone Perceptomatic	20	5	30	60
g. Cenco Tachisto-scope	3	--	--	33
h. Tachomatic 500	1	--	--	100
2. Individual				
a. AVR Eye Trainer	8	--	50	38
b. Learning-through-Seeing Tachisto-viewer	10	10	40	20
c. EDL Flash-X	45	7	58	78
d. Craig Reader	7	14	--	43

(continued)

TABLE 17 (continued)

Name of instrument	Number used	Percent		
		Little[a]	Moderate[b]	Great[c]
B. Directional attack control devices				
1. EDL Controlled Reader	140	5	19	71
2. PDL Perceptoscope	4	25	--	75
3. Cenco	2	--	50	50
C. Accelerators				
1. SRA Accelerator	74	18	41	36
2. AVR Rateometer	23	26	43	26
3. Psychotechnics Shadowscope	4	25	--	75
4. Stereo-Optical Reading Rate Controller	2	--	50	--
5. Keystone Accelerator	1	--	--	100
6. Literary Notes Pacer	2	--	--	50
D. Listening devices				
1. Record player	143	2	18	79
2. Cassette playback unit	81	--	23	69
3. Listening station	22	--	9	68
4. Language lab	29	--	28	69
5. Talking Page	7	14	--	71

(continued)

TABLE 17 (continued)

Name of instrument	Number used	Percent		
		Little[a]	Moderate[b]	Great[c]
E. Recording devices				
1. Reel-to-reel tape recorders	125	5	26	63
2. Cassette tape recorder	94	3	21	64
3. Card readers	85	--	28	62
4. Dictaphone	1	--	--	--
F. Projectors				
1. Motion picture projector	80	6	19	66
2. Filmstrip projector	54	6	11	78
3. Overhead projector	41	12	24	63
4. Opaque projector	17	18	12	59
5. Slide projector	3	--	--	100
6. Super 8 projector	5	--	60	20
7. Filmstrip viewer	8	--	13	63
8. Dukane projector	4	--	--	100
9. EDL Aud-X	9	--	--	100
10. Show-n-Tell Projector	1	--	--	100
11. Hoffman projector	6	--	--	67

(continued)

TABLE 17 (continued)

Name of instrument	Number used	Percent		
		Little[a]	Moderate[b]	Great[c]
G. Instructional television	54	13	35	44
H. Computer-assisted instruction	3	33	--	33
I. Miscellaneous				
1. Cycloteacher	5	--	--	40
2. Autotutor	2	--	--	50
3. Stopwatch	108	8	25	55
4. Typewriter	10	--	20	70
5. Phonic mirror	1	--	--	100
6. EDL Skimmer	3	33	33	33
7. System 80	2	--	--	100
8. EDL Aud-X	9	--	--	100
9. Show-n-Tell Projector	1	--	--	100
10. Hoffman projector	6	--	--	67

[a]Little--used less than 6 times per year.

[b]Moderate--used between 6-25 times per year.

[c]Great--used more than 25 times per year.

Note: Percentages across the rows do not always add up to 100% because some districts failed to include frequency of use.

APPENDIX B

READING INSTRUMENT USAGE QUESTIONNAIRE

COVER LETTER

Rutgers--The State University
Graduate School of Education
New Brunswick, New Jersey 08903

TO: NEW JERSEY PUBLIC SCHOOL SUPERINTENDENTS

FROM: READING CENTER

RE: SURVEY OF READING INSTRUMENT (MACHINE) USAGE IN NEW JERSEY PUBLIC SCHOOLS

The Reading Center at Rutgers University, in conjunction with the International Reading Association, is interested in ascertaining the degree of reading machinery usage in the public schools. To do this, we are asking that each New Jersey school district fill out a brief questionnaire. The findings of this survey will be presented at the April, 1971, Convention of the International Reading Association.

We would appreciate it if you could aid us in this survey by forwarding the enclosed questionnaire to the person in the district best qualified to answer it. If there is a separate supervisor for each school level (elementary, intermediate, secondary), please duplicate and provide each one with a copy.

Please have the questionnaires returned to the following address:

Reading Center
Graduate School of Education
Rutgers University
New Brunswick, New Jersey 08903

Thank you in advance for your prompt return of this questionnaire.

Enclosure

NAME OF RESPONDENT_____ POSITION_____

SCHOOL DISTRICT_____ DATE_____

SIZE OF AREA REPORTING
(are you reporting for the whole district or a school, etc.?)_____

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Developmental	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Remedial	For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
A. Tachistoscopes					
1. For group use					
a. EDL Tach-X					
b. Keystone Flashmeter					
c. SVE Speedi-oscope					
d. Learning through Seeing Tachistoflasher					

(continued)

QUESTIONNAIRE (continued)

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Developmental	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Remedial	For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
e. Psychotechnics Tachistoscope					
f. Other					
2. For individual use a. AVR Eye Trainer					
b. Learning through Seeing Tachistoviewer					
c. EDL Flash-X					

(continued)

QUESTIONNAIRE (continued)

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Developmental	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Remedial	For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
d. Other					
B. Directional attack control devices					
1. EDL Control Reader					
2. PDL Perceptoscope					
3. Other					
C. Reading accelerators or pacers					
1. SRA Accelerator					

(continued)

QUESTIONNAIRE (continued)

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12)		For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
			Developmental	Remedial	
2. AVR Rateometer					
3. Psychotechnics Shadowscope					
4. Stereo-optical Reading Rate Controller					
5. Other					
D. Listening devices 1. Record player					
2. Cassette playback unit					

(continued)

QUESTIONNAIRE (continued)

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Developmental	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Remedial	For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
3. Language lab					
4. Other					
E. Recording devices					
1. Reel-to-reel tape recorder					
2. Cassette tape recorders					
3. Card recorders (i.e., Language Master)					
4. Other					

(continued)

QUESTIONNAIRE (continued)

Name of instrument	Has it been used within last year? (yes or no) Indicate number of instruments	Frequency of use (great--over 25 times/yr; moderate--6-25 times/yr; little--less than 6 times/yr)	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Developmental	At what grade levels is it used? (K-3, 4-6, 7-9, 10-12) Remedial	For what purpose is it used? (i.e., phonics, comprehension, speed, etc.)
F. Motion picture projector					
G. Instructional television					
H. Computer-assisted instruction					
I. Stopwatch					

Please list any other instruments (machines) that you use for the teaching of reading.